SYSTEMS, METHODS, AND COMPUTER PROGRAM PRODUCTS FOR GENERATING A DIGITAL IMPAIRMENT LEARNING SIGNAL HAVING LOW ENERGY CONTENT AT DIRECT CURRENT AND NYQUIST FREQUENCIES *09/430697*

Abstract of the Disclosure

Systems, methods, and computer program products generate a DIL signal in which the length of the sign pattern used for symbols in the DIL signal is a positive integer that wholly divisible by four and is not wholly divisible by three. The sign pattern may be viewed as comprising both an even and an odd subsequence with the number of positive signs balancing the number of negative signs in each subsequence. The DIL signal may be distorted by analog impairments, such as transformers, that may introduce nulls at direct current (DC) and severe non-linear distortion below 100 Hz. Moreover, low-pass filters in the PSTN typically have a sharp roll-off at the Nyquist frequency of 4 kHz. A DIL signal that includes one or more DIL segments with each DIL segment incorporating the aforementioned sign pattern may be characterized by spectral nulls at both direct current (DC) and the Nyquist frequency, which is 4 kHz for a V.90 modem application.

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